Omeo projecte de Bart Smit, Carl Megens, David Menting, Emar Vegt and Milou Pikaart

OSCAR TOMICO Oscar Tomico is currently Assistant Professor of the Designing Quality in Interaction Research Group at the Department of Industrial Design, Eindhoven University of Technology. His main areas of study involve the discovery and learning of strategies

Co-reflection

User involvement aimed at societal transformation

THIS ARTICLE PRESENTS AN APPROACH TO USER INVOLVEMENT THAT ALLOWS CONFRONTING THE DESIGNER'S RATIONALE WITH SOCIETY'S MOTIVATIONS AND VALUES. THIS APPROACH IS SPECIFICALLY TAILORED FOR DESIGN PROCESSES AIMED AT SOCIETAL TRANSFORMATION. IN THIS APPROACH, USER INVOLVEMENT IS CONSIDERED AS A CONSTRUCTIVE PROCESS, RATHER THAN A DESTRUCTIVE PROCESS. MORE PRECISELY, IT IS DEFINED AS A CO-REFLECTIVE SESSION BETWEEN DESIGNERS AND USERS THAT STARTS BY SENSITISING TO CONSTRUCT THE USER'S DESIRED REALITY IN ORDER TO CONFRONT IT WITH THE DESIGNER'S RATIONALE.

Introduction

The final decades of the twentieth century were marked by the rapid introduction and widespread adoption of digital technologies in everyday life. Mobile telephones, digital cameras, personal musical players, home automation devices, and many more, permeate the everyday in one way or another. Designing these electronic products and systems requires taking into consideration the type of influence that is desirable. This brings the ethical dimension of design to the fore. Why and how do we want these systems to transform our behaviours and experiences?

This article proposes a co-reflective process for user involvement, which starts by getting acquainted with the current societal context in order to envision a new reality. This new reality comprises motivational and ethical aspects of the users' vision of the now, allowing them to establish a comparison with the designers' transformative vision. This process can be developed in three parts: exploration of the current situation, ideation through a discovery process and confrontation with the current stage of the design process. Each part builds over the next. Exploration of the current situation is used as the basis for an ideation process. At the same time, this ideation part is used as an empathy tool to

make users more aware of their own motivations and desires so as to confront them with the ideas that the designers have. This process can be repeated a multitude of times during the design process. A co-reflective session uses motivational drives to converge the point of view of designers and users, triggering reflection for the design action and analysis strategies.

The co-reflective process presented above was applied in the Design for Interaction Master Course at the TU/e's Department for Industrial Design (26 students, 6 groups), forming part of the Microsoft 2008 Design Challenge. The 2008 Design Challenge explored the importance of learning and education. The aim was to find ways to improve the daily life of a wide variety of users through learning and education: ranging from promoting creativity and curiosity in new topics, right through to demonstrating novel ways of providing instruction, including the rethinking of educational systems and tools. Two of the developed projects were chosen to illustrate the different ways that this co-reflective process is applied.

1. The role of products as transformational agents

A central idea in the theory of Technological Mediation is that technological devices co-shape people as actors in the world. It is through this 'mediation' that transformations occur. Verbeek[1] discerns two levels of transformation: level of experience and level of behaviour. When a person interacts with a product, this interaction influences the way he or she experiences and behaves in the world. Both these levels of transformation have specific structures.

Transformation of experience has a structure of amplification and reduction. This means that when a person interacts with a device, this interaction causes some aspects of reality to be amplified in the experience of the person interacting, while at the same time the experience of other aspects of reality is reduced. As an example, an mp3 player amplifies the experience of music while at the same time reducing the experience of sound in the environment, since sound is blocked or overpowered by the mp3 player audio feed.

Transformation of behaviour has a structure of invitation and inhibition. Scripts for action are inscribed into devices. These scripts promote certain behaviours and inhibit others. The mp3 player also provides an example of transformation in behaviour. It invites people that use it to concentrate on their own work, but at the same time it also inhibits social interaction with people in close proximity, resulting in less social interaction in public spaces.

If we agree that products and systems transform our behaviour and experiences, we need to take into account how we would like these systems to transform us.[2] If transformation through technology occurs inherently, how can we direct this transformation along the desired course? The word 'desirable' brings the ethical dimension of design to the fore. What is a desirable transformation of behaviour and experience?

This transformation role of technologies, which we encounter in design, mainly has an everyday character that is subtle yet nonetheless influential. Quite often it is implicit in the design process, but that does not mean that possible effects on people do not exist. Anthony Dunne identifies and illustrates implicit values in design and their effect on behaviour in interactive products: "The more time we spend using them the more time we spend as a caricature".[3]

1. VERBEEK, P.P. (2005) *What things do—Philosophical Reflections on Technology, Agency, and Design.* Penn State: Penn State University Press.

2. ROSS, P.R. (2008) *Ethics and Aesthetics in Intelligent Product and System Design.* PhD thesis. Eindhoven: Eindhoven University of Technology;
VERBEEK, P.P. (2006). "Materializing Morality – Design ethics and technological mediation". *Science, Technology and Human Values*. 31. 3.

2. A constructivist approach to confront the design rationale with society

The challenge that this article addresses resides in the kind of tools that are required for user involvement product design aimed at societal transformation. A process that explicitly aims to create new societal contexts requires tools that are sufficiently versatile to assist it and sufficiently broad-spreading to embrace the enormous variability of the users' possible needs, desires and fantasies, all of which are essential in order to comprehend the user-product relationship.

To be more specific, the questions addressed are: (a) how can a design process aiming for societal transformation be assisted? (b) How can designers still get users sufficiently involved to comment on their design process, even when it is not a final concept or when it is merely a vision? (c) How can users validate information that converges from design experimentation, analytical thinking and a transformative vision in order to allow the reflective action?

To answer these questions a methodological approach is considered, which is not based on the hypothetical-deductive paradigm but on dialectical inquiry (inductive process). This approach is rooted in constructivist psychology.[4] An essential task, from a constructivist perspective, is to understand how the characteristics of people are involved in the process of experiencing; how people participate in co-creating the dynamic personal realities to which they individually respond.[5] The subject is a much more active participant in constructivist therapeutic sessions. He or she defines relevant elements related to the context that is addressed in a format that is not limited to corroboration of the hypothesis, but instead generates information.

It is based on these constructivist therapeutic sessions that an exercise of co-creative investigation can be established from expert to expert (two-way trust principle) during the design process. The user is the expert in the context to be addressed, while the interviewer (designer) is the expert on how to implement it into a product or service. This co-reflective process is a constructive and systemised event. Its versatile and holistic nature allows obtaining more trustworthy information from the relationship between designers and users, while steering reflection in different directions:

- In part there is the guarantee that the information that is collected is always relevant to the user because the user actually generates it. Thus it allows designers to reflect on their transformative vision by means of user validation.

- The interviewer does not suggest elements that are to be evaluated. With this method the designers' previous conceptions about the product (actual state of development) do not influence the user, hence considerably increasing reliability of the information that is obtained and, as a result, allowing designers to reflect on their explorative actions and procedures.

- A high level of detail of the product characteristics, interaction possibilities and context of use can be obtained. This allows us to create a guideline for the design process that is far more precise, as we will know what really affects the user and why and how it should be addressed, thus allowing designers to reflect on their analysis and abstraction strategies.

These therapeutic sessions can be easily adopted for use in design processes aimed at societal transformation. They allow for a co-reflective process between the designer and the users at different levels of abstraction (physical characteristics, associated behaviours and related values).

3. DUNNE, A. (1999). *Hertzian Tales: Electronic Products, Aesthetic Experience and Critical Design. PhD thesis.* London: RCA CRD Research.

4. KELLY, G.A. (1955). *The Psychology of Personal Constructs*. Vols. 1 & 2. London: Routledge.

5. MAHONEY, M. J. (1995). "Continuing evolution of the cognitive sciences and psychotherapies," in R.A. Neimeyer, M. J. Mahoney (Eds.). *Constructivism in Psychotherapy.* Washington: APA.

In fact they provide reference points in order to generate a transformative vision that takes into account the ethical implications of technological developments.

3. Methodological Proposals for Co-reflective tools

Co-reflection has been previously described as co-creative investigation. To achieve this users involved in the interview should start with the least amount of information possible (their own experience) and then build on it. The interviewer should never make the users explore, comment or reason with predefined information. Users should be the ones to integrally provide all the elements for discussion.

The present article proposes a co-reflective process, which starts by becoming acquainted with current societal context in order to envision a new reality. This new reality comprises the motivational aspects of the users' vision of the now and its ethical dimensions, thus allowing them to establish a comparison with the designers' transformative vision. This process can be developed in three parts: exploration of the current situation, ideation through a discovery process and confrontation with the current stage of the design process. Each part builds over the next. Exploration of the current situation is used as the basis for an ideation process. In turn, this ideation part is used as an empathy tool to make users more aware of their own motivations and desires to thus confront them with the ideas that the designers have. This process can be repeated many times during the design process as it intertwines, in a holistic approach, with the different design iterations.

A co-reflective session uses motivational drives so that the point of view of designers and users can converge to then trigger reflection on the design action and analysis strategies:

- Exploration starts by analysing the social phenomena, creating sound grounding for the ideation phase.

- Ideation is triggered by information obtained from exploration, which works as a constructive ideation process that builds on the existing concept, likewise representing empathetic warming up for confrontation.

- Confrontation basically updates the designer's transformational vision by merging it with the users' desires and aspirations.

Exploration Phase

The exploration phase focuses on the current experience with existing contexts, products, prototypes or services as a starting point of the process. Exploration jointly applied with discursive techniques, such as dialectical laddering,[7] highlights the way people construct versions of mental, social and material events and processes as part of specific communicative practices. It inquires into the causes of social phenomena by understanding topics such as memory, attribution, attitudes and the implications between them.[8] It helps designers and users obtain a clear picture of the context that is to be addressed.

Techniques that are suitable for this phase consist in re-enacting the experience, narration and related situations. Re-enacting the experience is basically an immersive technique in which designers and users feel empathy with the context under investigation by experiencing it. Narration is an undercover analytical technique based on retrospective thinking, which considers users as the motivated storytellers. Comparisons are used in related situations to create mental maps of perceived differences, which is what the decision making process relies on.

6. HINKLE, D.N. (1965). *The Change of Personal Constructs from the Viewpoint of a Theory of Implications.* PhD thesis. Ohio: Ohio State University.

7. TOMICO, O. (2007). *Subjective Experience Gathering Techniques for Interaction Design.* PhD thesis. Barcelona: Technical University of Catalonia, UPC.

Ideation Phase

The ideation phase analyses past memories in order to project them into personal dreams of future experiences. Projective techniques are used to enhance sensitivity to tacit understanding. They work as a mode of guidance that underlies intuitive knowledge.[8] The results are sensory reconstructions of highly-general imagery, described as standing somewhere between perception and symbolic thought. They represent a more aesthetically rich and personally felt mode of mental awareness.[9] This helps designers and users discover a new reality (ideal situation/context), a new vision based on the users' own needs, desires and fantasies.

Techniques that can be applied are fantastic storytelling, relating values to behaviours and objects to trigger new realms. Fantastic storytelling uses past experiences as a source of inspiration to write desired interaction behaviour, thus forcing participants to break with the real world and reach the highest abstracted level, i.e. their fantasies. Values relating to behaviours use sensory metaphors to facilitate understanding of the complex emotional system through an intuitive idea (an example that already exists in everyday life with some high emotional content). The object of triggering new realms is based on using existing material, products or components to open new behavioural possibilities to participants and make them reflect on them.

Confrontation Phase

The confrontation phase focuses on analysing how the design concept suits the users as a transformational agent to create their new reality. These comparisons are based on obtaining the strengths and weaknesses of the designer's proposed vision through a scenario, by sketching an artefact or from a working prototype. The purpose is to find solutions for the weaknesses, while in turn enhancing the strengths. It is a constructive rather than a destructive process, which builds on the existing concept in order to find the path to be explored in the next iteration. Thus, it does not become prescriptive. It is a source of information for the designers' own work.

Suitable techniques to be used in the phase are built on a vision, on contextual use of an artefact and by experiencing low-fi prototypes. Building on a vision is based on displaying the scenario of a product that is still to be designed. Contextual use of an artefact basically employs an object as proof of the concept/placeholder of the transformative activity. Experiencing low-fi prototypes proposes a defined functionality that is linked to interaction that is still to be defined.

4. How Learning and Education Can Be Transformed through Design?

Twenty-five TU/e industrial design students took part in the Microsoft Design Challenge during the 2008 spring semester. They were divided into six groups, each consisting of two to five students. In six weeks, distributed throughout the semester in two-week blocks, they proceeded from the brief itself to fully working prototypes. During these six weeks the students positioned themselves in the theme by means of a transformative design vision in order to find their unique design challenges within a specific context. They went through several hands-on iteration cycles to create and deepen their insight into the design challenge.

Students used the co-reflective sessions to confront their proposals in a real-world setting with users. First, the co-reflective framework and the underlying constructivist theory were explained to the students. They then had to generate or adapt methods for user involvement that would be suitable for each of the three phases (exploration, ideation and confrontation). Two of the projects that

8. IPPOLITO, M.F. and TWENEY, R. D. (1995). "The Inception of Insight," in R. J. Sternberg and J. E. Davison (Eds.) *The Nature of Insight.* Cambridge: the MIT Press.

9. STEVENS, C. D. and WALKER, B. M. (2002). "Insight: Transcending the Obvious," in G.J. Neimeyer, R.A. Neimeyer (Eds.). *Advances in Personal Constructs Psychology, New Directions and Perspectives.* Westport: Praeger Publishers.

1

1. Sense6 project by Ivo de Boer, Joran van Aart, Bram Braat and Laurens Boer

were developed (Sense6 and Omeo) supported different learning strategies (learning by doing and learning from each other). Both projects and the co-reflection sessions that were developed are described in the following paragraphs.

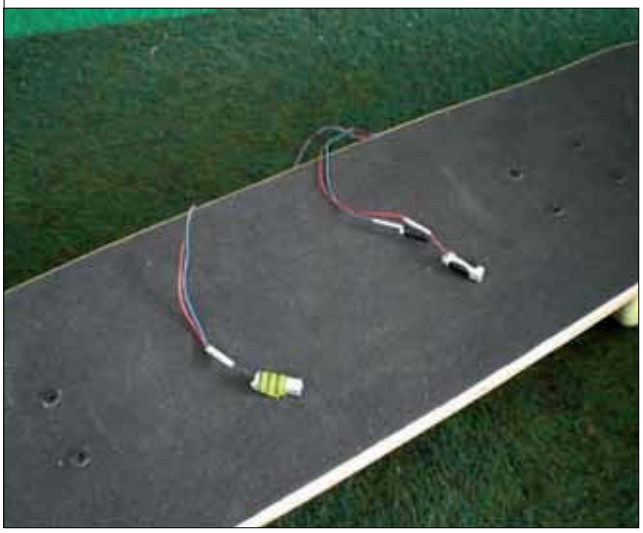
Learning by Doing

The Sense6 concept focuses on learning by doing. It explores non-obtrusive feedback on action through the connection between senses (synaesthesia). Sense6 is a sharing platform for skateboarders, in which feedback on action is not only used to improve the technique, but also to teach other people new tricks without any need for personal assistance.

2

2. Design students being taught a basic trick by skateboarders in a skate park

3



3. Skateboard with vibration sensors to communicate the designer's vision

In this case the goal for the first co-reflective session was to find acceptance on implementing technology in a skateboard and discover if the possibility of creating new interactions, functionalities and expressive modalities in communicating skateboarding tricks actually existed. The co-reflective session consisted in re-enacting the experience, fantastic storytelling and building on vision techniques.

Re-enacting the experience was based on open conversations with skateboarders and on observation of their behaviours. Students asked users to try and teach them one of the basic tricks. The aim was to find out what and how they communicate or help each other.

In the case of fantastic storytelling, students asked the skateboarders about the most important aspect to master a trick, followed by questions about what they would like in order to support learning the same trick in other ways. What they wanted to know was what the ideal situation would actually be and what assistance would be required.

To build on the vision students used open conversations with the skateboarders to obtain their ideas and insights for implementing technology on the board or on the skateboarders, rather than on the environment. The idea was to

4

4. Omeo project by Bart Smit, Carl Megens, David Menting, Emar Vegt and Milou Pikaart.

5

5. Drawing resulting from relating values to behaviours: Shut up! Stand in the hall! Nothing is allowed!

discover the level of acceptance that adding "intelligence" to the skateboard would have.

Learning from Each Other

The Omeo concept focuses on how family members share personal experiences. It explores how memories evolve over time, how family members relate differently to certain objects and how by sharing them, these differences can lead to better understanding of a recent event.

The co-reflective session consisted in creative involvement to trigger the subjects to come up with new ideas, making them think about the possibilities and ways in which one can remember important changes from past situations. In this case the co-reflective session involved relating situations, relating values to behaviours and contextual use of an existing artefact.

During the session involving relating of situations, the students asked the children to think back over time to find the memories they had. Starting with recent events, they progressively moved back in time until they reached their first memory. Subsequently the same pattern was followed with the parent(s). The goal was to find the differences between the way children and parents deal with memories, between

6

6. Contextual use of an existing artefact technique employed by a young child to establish how memories can be triggered by physical objects

what they can remember and what they want to remember. By relating values to behaviours the students wanted to find out how the subjects dealt with their memories (previously elicited by the technique of relating situations). More precisely, they wanted to find out if memories could be summarised at a key moment or in a key action. Children were asked to draw the key elements of an event or milestone in order to obtain this information.

During the contextual use of an existing artefact the children were asked to take pictures of things in the house that

reminded them of what had been discussed in the previous phase (key moments in their memories). The pictures were then reviewed in order to obtain the story that was behind the photographed items. The focus was put on how memories are stored in the physical world; discovering how artefacts are involved in remembering and reflecting..

5. Conclusions

This article presented an approach that allowed confronting the design rationale with society's motivations and values. Thus, validation is considered as a constructive rather than a destructive process. More precisely, it is defined as a co-reflective session between designers and users, which starts by sensitising to then construct their own reality so as to be descriptive rather than prescriptive.

In fact, the co-reflective process that is presented could be used as a source of information and inspiration for the design process. It assists designers so they can obtain more insight from the experiences they want to address, from values people have about a certain topic, desired usage (interaction), product characteristics or the significance they put on the product. In relation to other tools and co-design processes (that do not give the designer sufficient freedom to operate), co-reflection gives designers the opportunity to obtain a more profound understanding of the context, motivational aspects, associated behaviours and desired functionalities, while still allowing room to reach further beyond. Moreover, the examples illustrate the wide range of possibilities (variability) and applications it has by displaying its suitability for opportunity seeking instead of problem solving (transformative design approach).

In conclusion, developing co-reflective tools means to create dynamic and holistic tools that can adapt to an unstructured process. These tools can grow in complexity in relation to the design process phase, and that is exactly where their great potential resides. They can increase the level of detail of information that is obtained in the measure that the design process requires it.

Acknowledgements

Students from the Design for Interaction Master Course at the TU/e's Department of Industrial Design: Bart Smit, Carl Megens, David Menting, Emar Vegt, Milou Pikaart, Ivo de Boer, Joran van Aart, Bram Braat, Laurens Boer.

Research assistants from the /d.search-labs: Sjriek Alers and Chet Bangaru.

This work was part of the Microsoft Research Design Expo 2008.

References

Tomico, O., Frens, J.W. and Overbeeke, C.J. (2009). "Co-reflection: user involvement for highly dynamic design processes," in: *Proceedings of ACM CHI 2009* Conference on Human Factors in Computing Systems 2009. pp. 2695-2698.

Ross, P., Tomico, O. (2009). "Research-through-design for the consideration of ethical implications in Ambient Intelligent System Design: The Growth Plan Approach," in *Proceedings of the Killer Robots or Friendly Fridges: the Social Understanding of Artificial Intelligence Workshop at AISB Convention*. Edinburgh, Scotland, 7th April 2009.